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## Nothrid mites from Ecuador – recapitulation (Acari: Oribatida: Nothridae)

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ABSTRACT. The summary of studies on nothrid mites from Ecuador is presented. The author gives the list of all records, loci typica and a key to Ecuadorian species of the genus *Nothrus*.

Key words: taxonomy, acarology, Oribatida, Nothridae, Ecuador, Neotropical Region, key.

### INTRODUCTION

The present paper is a continuation of the studies on the nothrid mite fauna of Ecuador, based of the results of the circumtropical collecting program launched in 1963 by Prof. J. BALOGH. He and his co-workers collected partly in the Andes. Their samples were the base of the latest studies (KUTY 2006, 2007, KUTY & OLSZANOWSKI 2006). Six new species from Ecuador have been described and illustrated: *Nothrus olszanowskii* KUTY, 2006, *N. pallidus* KUTY, 2006, *N. piriformis* KUTY, 2006, *N. niedbalai* KUTY et OLSZANOWSKI, 2006, *N. cotopaxiensis* KUTY, 2007 and *N. gleasarius* KUTY, 2007. The morphology of juvenile stages of *N. cotopaxiensis* and *N. gleasarius* has been described as well. Moreover a redescription of *N. becki* BALOGH et MAHUNKA, 1981, which was noted as a new record in its distribution, has been given.

All new species were found in samples of moss, soil, litter and detritus from stones and below shrubs on the creek level, from the steep roadside, from the forest patch, shrubby secondary forest, dried out tussocks in closed forest stand, on cattle pasture from relatively dry grass and in cushion plants. All samples were collected from Ecuadorian provinces Pichincha, Imbabura and Cotopaxi, at 2650-3900 m a.s.l.

Furthermore, several collecting expeditions in the Galápagos Island were carried out by Prof. H. SCHATZ. Among 202 oribatid species, which were encountered from these Ecuadorian islands, there were only two nothrid species: *Nothrus anauniensis* CANESTRINI et FANZAGO, 1876 (*biciliatus* C.L. KOCH, 1844 sensu SCHATZ) and *N. oblongus* HAMMER, 1961 (SCHATZ 1998).

The purpose of this paper is to sum up all studies on the nine species from the *Nothrus* genus from Ecuador, present a list of records and propose a key to species.

#### MATERIALS AND METHODS

All descriptions were based on the material from the Basel Natural History Museum, Switzerland (samples collected by Prof. A. ZICSI and Dr. I. LOKSA from the provinces of Pichincha, Imbabura and Cotopaxi) and material collected by Xavier BARRIGA-BEDOYA in 2005 from the Cotopaxi province.

The mites were preserved in 75% ethanol and cleared in lactic acid. Two adults of *Nothrus cotopaxiensis*, one tritonymph and two adults of *N. glaesarius*, two adults of *N. niedbalai*, one of *N. pallidus* and one of *N. piriformis* were used in SEM. Specimens were examined with a scanning electron microscope in the Electron and Confocal Microscope Laboratory, A. Mickiewicz University, Poznań, Poland. They were mounted on stubs with double-sided sticky tabs, coated with gold in a Balzers SPC 050 ion coater and observed in a Philips 515 scanning electron microscope.

The holotype and 8 paratypes of *Nothrus cotopaxiensis*, the holotype and 14 paratypes of *N. glaesarius*, the holotype and 8 paratypes of *N. niedbalai*, the holotype of *N. olszanowskii*, the holotype and 3 paratypes of *N. pallidus*, the holotype and 2 paratypes of *N. piriformis* are stored in the Basel Natural History Museum, Switzerland. Three paratypes of *N. niedbalai* are deposited in the Hungarian National History Museum, Budapest. Comparative material is stored in the collections of Dr. Ziemowit OLSZANOWSKI and Małgorzata ŁOCHYŃSKA (Department of Animal Taxonomy and Ecology, A. Mickiewicz University, Poznań, Poland).

Morphological terminology used in the descriptions follows that developed by F. GRANDJEAN (see TRAVÉ and VACHON (1975) for references).

#### RESULTS

List of species recorded in Ecuador:

#### ***N. anauniensis* CANESTRINI et FANZAGO, 1876 (*biciliatus* C.L. KOCH, 1844 sensu SCHATZ)**

(= *Camisia biciliatus* OUDEMANS 1902, non C.L. KOCH 1841; *Nothrus biciliatus* SELLNICK & FORSSLUND 1955, SITNIKOVA 1975, BALOGH & MAHUNKA 1983; *Nothrus pseudoborussicus* MAHUNKA 1978)

- Galápagos Island (SCHATZ 1998).

***N. becki* BALOGH et MAHUNKA, 1981**

- Near Toachi, at meeting the old highway of Quito, about 50 m above the level of Rio Pilatón; 19 February 1986; moss from the steep roadside.

***N. cotopaxiensis* KUTY, 2007**

- Riverbank of Rio Alamo, 3 km from Nono, 2750 m; 4 February 1986; litter and soil from forest patch.

- Cotopaxi National Park, Province Cotopaxi; 26 February 1986; soil, detritus and tussocks.

- 8 km from Pifo, Province Pichincha, 2800 m; 18 February 1986; soil and litter from under dwarf shrubs in the upper third of the hollow.

- Cotacachi, on the banks of Rio Ambi, Province Imbabura; 22 February 1986; soil and detritus of reed.

***N. glaesarius* KUTY, 2007**

- 6 km from Psluguillo, Province Pichincha, 3900 m; 18 February 1986; cushion plants; tussocks and detritus; moss and cushion plants.

- Near Psluguillo, in the direction of Pifo, Province Pichincha, 3200 m; 18 February 1986; litter and soil from below shrubs bordering the creek.

- 30 km from Latacunga, Province Cotopaxi, 3700 m; 17 July 2005; detritus and soil from the plantation of *Pinus radiata*.

***N. niedbalai* KUTY et OLSZANOWSKI, 2006**

- Paschoa National Park, 2800-2850 m; 6 February 1986; moss and soil from a small clearing of the shrubby secondary forest; cattle pasture, detritus and soil of relatively dry grass.

- Psluguillo, about 20 km leaving Pifo, Province Pichincha, 3600 m; 18 February 1986; moss from stones, on the level of the creek; moss from rocks, ca 30 m above the creek level.

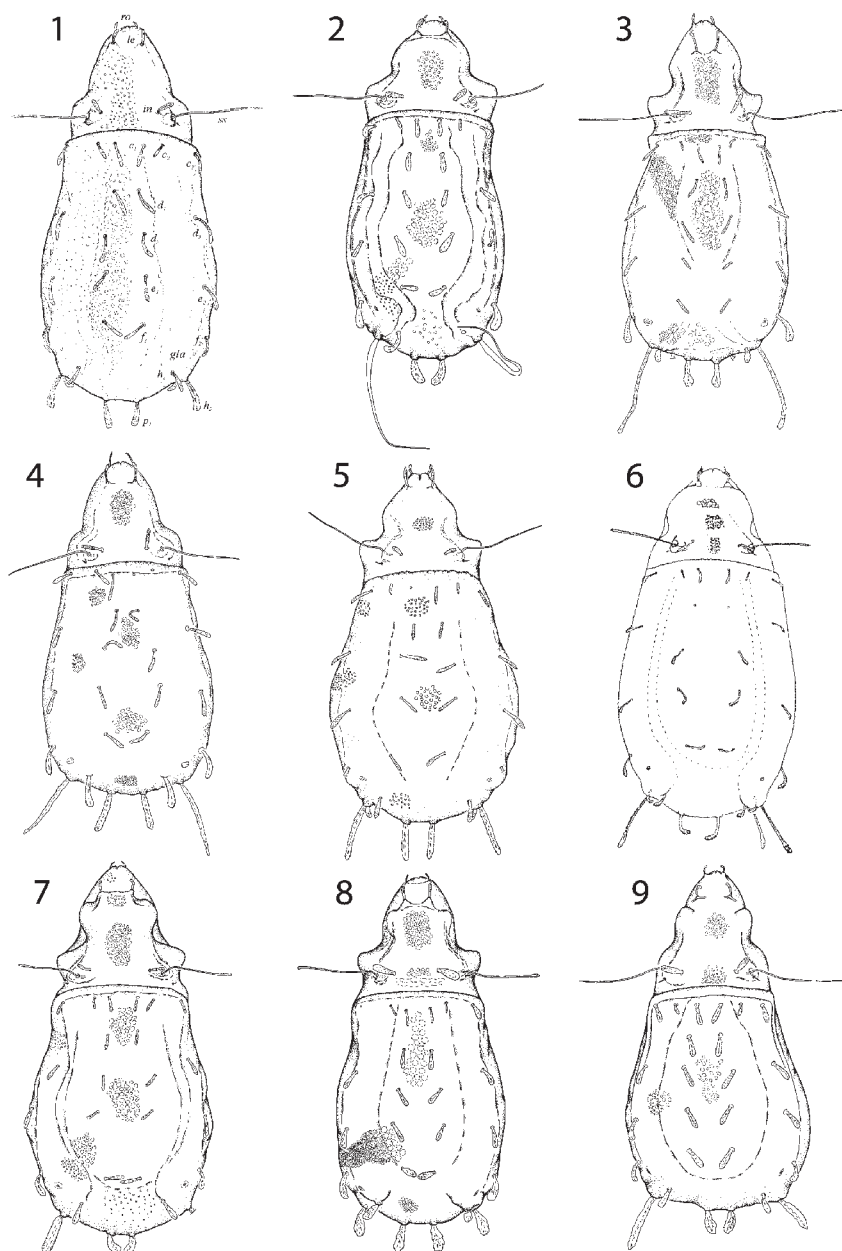
- 6 km leaving Psluguillo, Province Pichincha, 3900 m; 18 February 1986; moss and soil.

- Near Psluguillo, in the direction of Pifo, 3200 m; 18 February 1986; litter and soil from below shrubs bordering the creek.

- Cotopaxi National Park, Province Cotopaxi; 26 February 1986; dried out big tussocks from closed forest stand.

***N. oblongus* HAMMER, 1961**

- Galápagos Island (SCHATZ 1998).



1-9. Dorsum: 1 – *Nothrus anauniensis* CANESTRINI et FANZAGO, 1876 (after OLSZANOWSKI 1996), 2 – *N. becki* BALOGH et MAHUNKA, 1981, 3 – *N. cotopaxiensis* KUTY, 2007, 4 – *N. glaesarius* KUTY, 2007, 5 – *N. niedbalai* KUTY et OLSZANOWSKI, 2006, 6 – *N. oblongus* HAMMER, 1961 (after HAMMER 1961), 7 – *N. olszanskii* KUTY, 2006, 8 – *N. pallidus* KUTY, 2006, 9 – *N. piriformis* KUTY, 2006

***N. olszanowskii* KUTY, 2006**

- Naranhito, Province Cotopaxi, on the way to San Francisco de las Pampas, 2200 m; 9 February 1986; 1,5 km in the direction of Toachi, forest patch with many palm trees, litter and soil.

***N. pallidus* KUTY, 2006**

- Cotacachi, Province Imbabura, on the banks of Rio Ambi; 22 February 1986; soil and detritus of reed.

***N. piriformis* KUTY, 2006**

- Between Tandapi and Toachi, 15 km to Toachi, stream confluent with Rio Pilatón, 2 650 m; 19 February 1986; litter and soil from below shrubs, growing 30 m above the stream level.

- Pululagua crater and its surroundings, “Midad del Mundo”, Province Pichincha; 12 February 1986; eroded hollow in the direction of Midad del Mundo; moss from under bushes growing on the sides of the hollow.

- Between Tandapi and Toachi, 15 km to Toachi, stream confluent with Rio Pilatón, 2 650 m; 19 February 1986; somewhat farther from the stream, forest patch without reeds, litter and soil; forest patch, moss and soil from rocks.

- Cotopaxi National Park, Province Cotopaxi; 26 February 1986; dried out big tussocks from closed forest stand.

## ZOOGEOGRAPHICAL REMARKS

Locus typicus of *Nothrus becki* BALOGH et MAHUNKA, 1981: Villa-Hayes, 50 km N from Asunción, along the “Canatera Transchaco”, Paraguay; 1 January 1966; BERLESE samples from a marshy forest (BALOGH et MAHUNKA 1981). This species was also noted in Venezuela (SUBÍAS 2004). Ecuador is a new distribution record for this species.

Locus typicus of *N. oblongus* HAMMER, 1961: Near Huaraz 2 specimens in 1-2 cm; high, dry, brown-green moss on a stone dike at the Hotel Monterrey, Peru (HAMMER 1961). *N. oblongus* was also recorded in India (SUBÍAS 2004).

Locus typicus of *N. anauniensis* CANESTRINI et FANZAGO, 1876 is unknown. It has been recorded in Holarctic, Oriental and Australian Regions so far (OLSZANOWSKI 1996) and this new Neotropical record proved its cosmopolitan distribution.

A KEY TO ECUADORIAN SPECIES OF THE GENUS *NOTHRUS* (FIGURES 1-9):

- |                          |    |
|--------------------------|----|
| 1. Tarsi tridactyl ..... | 2. |
| - Tarsi monodactyl ..... | 6. |

2. Setae  $h_2$  longer than distance between their bases ... *N. becki* BALOGH et MAHUNKA
- Setae  $h_2$  shorter than distance between their bases ..... 3.
3. Setae  $h_2$  longer than  $p_1$  ..... *N. oblongus* HAMMER
- Setae  $h_2$  shorter than  $p_1$  ..... 4.
4. Setae  $h_1$  shorter than  $p_1$ ,  $p_1$  as long as the distance between their bases  
..... *N. anauniensis* CANESTRINI et FANZAGO (= *biciliatus* sensu SCHATZ)
- Setae  $h_1$  longer than  $p_1$ ,  $p_1$  longer than the distance between their bases ..... 5.
5. Setae  $c_2$  located closer to  $c_1$  than to  $c_3$  ..... *N. glaesarius* KUTY
- Setae  $c_2$  located in the middle  $c_1$  and  $c_3$  .... *N. niedbalai* KUTY et OLSZANOWSKI
6. Setae  $h_2$  as long as  $p_1$  ..... *N. pallidus* KUTY
- Setae  $h_2$  longer than  $p_1$  ..... 7.
7. Setae  $h_1$  shorter than  $d_2$  ..... *N. cotopaxiensis* KUTY
- Setae  $h_1$  longer than  $d_2$  ..... 8.
8. Sensilli sharpened on the ends, setae  $h_2$  twice longer than  $p_1$ , setae  $c_2$  located in the  
middle of  $c_1$  and  $c_3$  bases ..... *N. piriformis* KUTY
- Sensilli frayed on tips, setae  $h_2$  one-third length of  $p_1$ , bases of setae  $c_2$  located  
closer to  $c_1$  than to  $c_3$  ..... *N. olszanowskii* KUTY

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